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(54) ON-VEHICLE RADIO TELEPHONE SYSTEM

(57) Abstract:

PROBLEM TO BE SOLVED: To provide a radio telephone system that is of on-vehicle mount with low power consumption and that is automatically capable of setting to a cellular model or a cordless model.

SOLUTION: This on-vehicle radio telephone system 10 is provided with a radio section 13 and a control section 17. The control section 17 detects a current position received from a car navigation system ECU 22. When the current position is within a PHS area, the control section 17 detects a vehicle speed received from an engine ECU 20 and supplies power only to a PHS transmission reception section 13a to select transmission reception by the PHS transmission reception section 13a, when the vehicle speed is low. On the other hand, when the current position is located at the outside of the PHS area or the vehicle speed is high, and when the current position is within a personal digital cellular PDC area, the control section 17 supplies power only to a PDC transmission reception section 13b to allow the PDC transmission reception section 13b to make transmission reception, and when the current position is at the outside of the PDC, power is not supplied to the transmission reception sections 13a, 13b.

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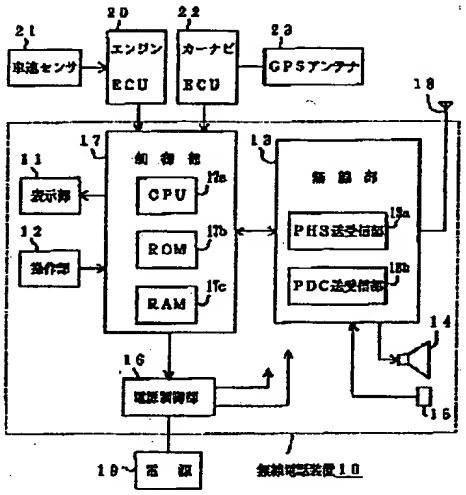

CLAIMS

[Claim(s)]

[Claim 1] In the radio telephone equipment for mount equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone A vehicle speed decision means to measure a vehicle speed detection means to detect the vehicle speed, and the vehicle speed and the predetermined rate detected by said vehicle speed detection means, and to judge whether this vehicle speed is a low speed, It changes so that it may transmit and receive with a cordless mold radiotelephone, if the vehicle speed is judged to be under a predetermined rate by said vehicle speed decision means. The radio telephone equipment for mount characterized by having the vehicle speed flattery change control means changed so that it may transmit and receive with a cellular mold radiotelephone, if the vehicle speed is judged to be more than a predetermined rate.

[Claim 2] In the radio telephone equipment for mount equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone A location detection means to detect the current position, and an area decision means to judge whether the current position detected by said location detection means belongs to the usable area of a cordless mold radiotelephone, It changes so that it may transmit and receive with a cordless mold radiotelephone, if it is judged that the current position belongs to said usable area with said area decision means. The radio telephone equipment for mount characterized by having the area flattery change control means changed so that it may transmit and receive with a cellular mold radiotelephone, if the current position is judged not to belong to said usable area.

[Claim 3] In the radio telephone equipment for mount equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone A vehicle speed decision means to measure a vehicle speed detection means to detect the vehicle speed, and the vehicle speed and the predetermined rate detected by said vehicle speed detection means, and to judge whether this vehicle speed is a low speed, A location detection means to detect the current position, and an area decision means to judge whether the current position detected by said location detection means belongs to the usable area of a cordless mold radiotelephone, It changes so that the current position may transmit [the vehicle speed is judged to be a low speed by said vehicle speed decision means, and] and receive with a cordless mold radiotelephone in said usable area with said area decision means, a group then when it is judged. The radio telephone equipment for mount characterized by having the change control means which the vehicle speed is not a low speed, or is changed so that it may transmit and receive with a cellular mold radiotelephone, when the current position does not belong to said usable area.

[Claim 4] It is the radio telephone equipment for mount characterized by being a radio telephone

equipment for mount according to claim 3, and said change control means supplying power to neither a cordless mold radiotelephone nor a cellular mold radiotelephone when the current position moreover does not belong to the usable area of a cellular mold radiotelephone by the case where the vehicle speed is not a low speed or the current position does not belong to said usable area.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] this invention relates to the radio telephone equipment for mount equipped with both the cordless mold radiotelephone represented by PHS (Personal Handyphone System, Personal Handyphone System) and the cellular mold radiotelephone represented by PDC (Personal Digital Cellular and personal digital - cellular), such as a cellular phone.

[0002]

[Description of the Prior Art] What was indicated by JP,9-163450,A is known as a radio telephone equipment equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone. This radio telephone equipment is constituted [both] so that either of PHS which is PDC and the cordless mold which are a cellular mold can operate a wireless receive section, the wireless transmitting section, and a control section, when it can communicate with PHS, it registers with that base station, and when it cannot communicate with PHS, it controls by the control section to register to a PDC base station. If the registration to a base station is always tried with PHS, the registration is successful and the registration will not specifically be [it will consider as the waiting receptacle condition for reception with PHS and] successful, it considers as the waiting receptacle condition for reception in PDC.

[0003] If phonecall charges and power consumption could be saved since according to this radio telephone equipment phonecall charges were cheap when it was able to talk over the telephone with PHS, it operated as PHS with small power consumption, and it was set automatically by PDC only when a message with PHS was impossible, and it goes into the area which can moreover talk PDC over the telephone, it can talk over the telephone also on a high-speed mobile anywhere again, and reception also becomes always possible.

[0004]

[Problem(s) to be Solved by the Invention] However, in the radio telephone equipment of JP,9-163450,A, the registration to a base station is always tried with PHS, and in order for PHS to determine whether the waiting receptacle for reception is carried out, or the waiting receptacle for reception is carried out by PDC, even when the waiting receptacle for reception is being carried out

by PDC, it is necessary to supply power to PHS continuously by whether the registration is successful or it does not carry out. That is, when the waiting receptacle for reception was being carried out by PDC, PHS will also consume power and had [irrespective of] the problem that sufficient power-saving effectiveness was not acquired.

[0005] This invention is made in view of the above-mentioned technical problem, and it is an object for car loading and aims at offering the radio telephone equipment which can set automatically in a cellular mold or a cordless mold with low power.

[0006]

[The means for solving a technical problem and an effect of the invention] In order to solve the above-mentioned technical problem, invention according to claim 1 In the radio telephone equipment for mount equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone A vehicle speed decision means to measure a vehicle speed detection means to detect the vehicle speed, and the vehicle speed and the predetermined rate detected by said vehicle speed detection means, and to judge whether this vehicle speed is a low speed, It changes so that it may transmit and receive with a cordless mold radiotelephone, if the vehicle speed is judged to be under a predetermined rate by said vehicle speed decision means. If the vehicle speed is judged to be more than a predetermined rate, it will be characterized by having the vehicle speed flattery change control means changed so that it may transmit and receive with a cellular mold radiotelephone.

[0007] In this radio telephone equipment for mount, a vehicle speed decision means measures the vehicle speed and the predetermined rate which were detected by the vehicle speed detection means, and judges whether this vehicle speed is a low speed. Moreover, a vehicle speed flattery change means has cheap phonecall charges, if the vehicle speed is a low speed, and it changes so that it may transmit and receive with a cordless mold radiotelephone with small power consumption, and if the vehicle speed is not a low speed, not the cordless mold radiotelephone that cannot talk over the telephone by the high-speed mobile but phonecall charges and power consumption are comparatively high (if high-speed [get blocked and]), but it will be changed so that it may transmit and receive with the cellular mold radiotelephone which can talk over the telephone by the high-speed mobile. In addition, although a vehicle speed decision means measures the vehicle speed and a predetermined rate and it judges whether it is a low speed, the predetermined rate in that case is suitably set up in consideration of the rate region which can talk cordless mold telephone over the telephone.

[0008] According to this radio telephone equipment for mount, compared with the case where only a cellular mold is used, phonecall charges and power consumption can be low stopped by considering as a cordless mold, when a low speed [the vehicle speed], and changing to a cellular mold, only when the vehicle speed is a high speed. Moreover, in order for there to be nothing then and to change a cordless mold or a cellular mold according to the vehicle speed according to the information

acquired through a radiotelephone, When supplying power to the cordless mold, the electric power supply to a cellular mold is stopped. Conversely, when supplying power to the cellular mold, the electric power supply to a cordless mold can be stopped, and compared with the case where power is continuously supplied to a cordless mold like the radio telephone equipment of JP,9-163450,A, power consumption can be stopped low.

[0009] Moreover, invention according to claim 2 is set to the radio telephone equipment for mount equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone. A location detection means to detect the current position, and an area decision means to judge whether the current position detected by said location detection means belongs to the usable area of a cordless mold radiotelephone, It changes so that it may transmit and receive with a cordless mold radiotelephone, if it is judged that the current position belongs to said usable area with said area decision means. If the current position is judged not to belong to said usable area, it will be characterized by having the area flattery change control means changed so that it may transmit and receive with a cellular mold radiotelephone.

[0010] In this radio telephone equipment for mount, an area decision means judges whether the current position detected by the location detection means belongs to the usable area of a cordless mold radiotelephone. moreover, as for an area flattery change means, the current position belongs to said usable area -- if it becomes, phonecall charges are cheap, and it changes so that it may transmit and receive with a cordless mold radiotelephone with small power consumption, and the current position does not belong to said usable area -- if it becomes, although phonecall charges and power consumption are comparatively high, it will change so that usable area may transmit and receive with a large cellular mold radiotelephone.

[0011] According to this radio telephone equipment for mount, compared with the case where only a cellular mold is used, phonecall charges and power consumption can be low stopped by considering as a cordless mold, when the current position is in the usable area of a cordless mold radiotelephone, and changing to a cellular mold, only when it separates from this usable area. Moreover, in order for there to be nothing then and to change a cordless mold or a cellular mold according to the current position according to the information acquired through a radiotelephone, When supplying power to the cordless mold, the electric power supply to a cellular mold is stopped. Conversely, when supplying power to the cellular mold, the electric power supply to a cordless mold can be stopped, and compared with the case where power is continuously supplied to a cordless mold like the radio telephone equipment of JP,9-163450,A, power consumption can be stopped low.

[0012] Furthermore, invention according to claim 3 is set to the radio telephone equipment for mount equipped with both the cordless mold radiotelephone and the cellular mold radiotelephone. Said vehicle speed detection means, said vehicle speed decision means, said location detection means, and said area decision means, It changes so that the current position may transmit [the

vehicle speed is judged to be a low speed by said vehicle speed decision means, and] and receive with a cordless mold radiotelephone in said usable area with said area decision means, a group then when it is judged. It is characterized by having the change control means which the vehicle speed is not a low speed, or is changed so that it may transmit and receive with a cellular mold radiotelephone, when the current position does not belong to said usable area.

[0013] In this radio telephone equipment for mount, the vehicle speed is a low speed, and when the current position belongs to the usable area of a cordless mold radiotelephone, a change control means is changed so that it may transmit and receive with a cordless mold radiotelephone, and or the vehicle speed is not a low speed, when the current position does not belong to the usable area of a cordless mold radiotelephone, it is changed so that it may transmit and receive with a cellular mold radiotelephone. That is, since a cordless mold cannot be used if the current position becomes the usable area of a cordless mold radiotelephone outside even if the vehicle speed is a low speed, and a cordless mold cannot be used if the vehicle speed is high-speed even if the current position is in the usable area of a cordless mold radiotelephone, in such a case, it changes at a cellular mold. According to this radio telephone equipment for mount, the same effectiveness as claims 1 and 2 is acquired effectively.

[0014] In the radio telephone equipment for mount of this claim 3, as indicated to claim 4, the vehicle speed is not a low speed, or when the current position moreover does not belong to the usable area of a cellular mold radiotelephone, said change control means may consist of cases where the current position does not belong to said usable area so that power may be supplied to neither a cordless mold radiotelephone nor a cellular mold radiotelephone. In this case, since it consumes power with neither of the radiotelephones in being unusable, power consumption can be stopped further.

[0015]

[Embodiment of the Invention] Below, the suitable operation gestalt of this invention is explained based on a drawing. Drawing 1 is a block diagram showing the whole radio-telephone-equipment configuration for mount of the operation gestalt to which this invention was applied.

[0016] The radio telephone equipment 10 for mount may be deferred by the car like a land mobile radiotelephone, or is carried like a general cellular phone. The displays 11, such as LCD for this radio telephone equipment 10 for mount to display the message transmitted from other telephone equipments, actuation guidance / actuation situation of this telephone equipment 10, etc., The control unit 12 equipped with the key switch group for performing a dial input, directions of message initiation and termination, Cana, an alphabetic-character input, etc., The wireless section 13 transmit and receive voice by the well-known modulation technique through the antenna 18 for performing radio between the base stations which are not illustrated, The loudspeaker 14 for outputting a partner's voice at the time of a message, and the microphone 15 for inputting one's voice at the time

of a message, It has the power control section 16 for controlling the electric power supply from a power supply section 19 to each part of the radio telephone equipment 10 for mount, and the control section 17 which consists of a microcomputer which consisted of well-known CPU17a, ROM17b, RAM17c, etc.

[0017] An engine ECU 20 and car navigation (henceforth car navigation ECU) ECU 22 are connected to the control section 17 as an external instrument. Although an engine ECU 20 performs various kinds of processings required for engine control, with this operation gestalt, the role which outputs the input signal from the speed sensor 21 which detects the vehicle speed to a control section 17 is played. Moreover, although processing which displays the current position on the map is performed while car navigation ECU 22 displays a map on the display screens, such as LCD of the mount which is not illustrated, with this operation gestalt, the role which outputs the current position for which received the electric wave of a satellite from the GPS antenna 23, and it asked using the principle of triangulation to a control section 17 is played.

[0018] A loudspeaker 14 and a microphone 15 are connected to the wireless section 13, and PDC transceiver section 13b for functioning as PDC which is PHS transceiver section 13a for functioning as PHS which is a cordless mold radiotelephone, and a cellular mold radiotelephone is prepared according to the individual, respectively. PHS transceiver section 13a and PDC transceiver section 13b output as voice the received wave from the base station which transmitted the voice inputted into the microphone 15 to the base station through the antenna 18, and was received with the antenna 18 from a loudspeaker 14 like well-known PDC and PHS, respectively.

[0019] That is, if PHS transceiver section 13a of the wireless section 13 will be in the base station of PHS, and the condition which can be transmitted and received through an antenna 18 if power is supplied from the power control section 16, and an antenna 18 receives the received wave from a base station, after it will change this into the signal of an intermediate frequency band and will change it into baseband signaling further, it is changed into an analog signal through predetermined processing, and is outputted as voice from a loudspeaker 14. Moreover, after changing into a digital signal the analog signal inputted into the microphone 15, it considers as baseband signaling by the transmit timing defined by the time-sharing-control circuit which is not illustrated, this baseband signaling is modulated, and it changes into the signal (1.9GHz band) which has the radio frequency of a cordless method, and transmits to a base station from an antenna 18.

[0020] Moreover, if PDC transceiver section 13b of the wireless section 13 will be in the base station of PDC, and the condition which can be transmitted and received through an antenna 18 if power is supplied from the power control section 16, and an antenna 18 receives the received wave from a base station, after it will change this into the signal of an intermediate frequency band and will change it into baseband signaling further, it is outputted as voice from a loudspeaker 14 after changing into an analog signal through predetermined processing. Moreover, after changing into a

digital signal the analog signal inputted into the microphone 15, it becomes irregular by the transmit timing defined by the time-sharing-control circuit which is not illustrated, and this is transmitted to a base station from an antenna 18.

[0021] Next, processing of the control section 17 of the radio telephone equipment 10 for mount of the above-mentioned configuration is explained. Although CPU17a of a control section 17 performs various kinds of programs memorized by ROM17b, it explains the mode-of-operation change processing performed by every predetermined time (for example, several ms) here. Drawing 2 is the flow chart of this mode-of-operation change processing.

[0022] If this processing is started, CPU17a of a control section 17 will detect first the current position inputted from car navigation ECU 22 in step (it is called Following S) 110. In addition, car navigation ECU 22 may ask for the current position of a car using the electric wave sent not only from GPS but from a beacon etc., and may ask for the current position of a car from a bearing sensor and a speed sensor (or wheel speed sensor).

[0023] In S120 continuing, as for CPU17a of a control section 17, the current position judges whether it is the inside of PHS area. With this operation gestalt, PHS area information (information which shows whether PHS is usable in which area) is beforehand memorized by ROM17b of a control section 17. CPU17a tests the current position and this PHS area information by comparison. If the current position is outside PHS area (it is NO at S120), it will progress to S160 later mentioned since the message with PHS is impossible. The vehicle speed detected with the speed sensor 21 through the engine ECU 20 on the other hand by S130 continuing when the current position was in PHS area (it is YES at S120) is inputted. Furthermore, the predetermined rate (numeric value defined within the limits of 10 - 20 km/h as a rate to which PHS can telephone with this operation gestalt) beforehand memorized by this vehicle speed and ROM17b by S140 continuing is measured. And if the vehicle speed of a low speed, i.e., the vehicle speed, is smaller than a predetermined rate (it is YES at S140), power will be supplied only to PHS transceiver section 13a of the wireless section 13 through the power control section 16 by S150 continuing, and it will change so that it may transmit and receive in PHS transceiver section 13a, and this processing will be finished. On the other hand, if a high speed, i.e., the vehicle speed, becomes more than a predetermined rate (it is NO at S140), since the message with PHS is impossible, the vehicle speed will progress to S160.

[0024] In S160, as for CPU17a of a control section 17, the current position judges whether it is the inside of PDC area. With this operation gestalt, PDC area information (information which shows whether PDC is usable in which area) is beforehand memorized by ROM17b of a control section 17. CPU17a tests the current position and this PDC area information by comparison, it changes them so that power may be supplied only to PDC transceiver section 13b of the wireless section 13 through the power control section 16 by S170 continuing and it may transmit and receive in PDC transceiver section 13b, if the current position is in PDC area (it is YES at S160), and it finishes this processing.

On the other hand, if the current position is outside PDC area (it is NO at S160), since PHS or PDC cannot talk over the telephone, either, power will be supplied through the power control section 16 to neither PHS transceiver section 13a nor PDC transceiver section 13b by S180 continuing, but this processing will be finished.

[0025] As mentioned above, according to this radio telephone equipment 10 for mount, in PHS area, if the vehicle speed is a low speed, the current position Change so that phonecall charges and power consumption may transmit and receive in comparatively low PHS transceiver section 13a, and if the outside of PHS area or the vehicle speed has the high-speed current position Since it changes so that it may transmit and receive in PDC transceiver section 13b which can talk over the telephone by the high-speed mobile although phonecall charges and power consumption are comparatively high, compared with the case where only PDC transceiver section 13b is used, phonecall charges and power consumption can be stopped low.

[0026] Moreover, this radio telephone equipment 10 for mount does not change a mode of operation according to the information acquired through the wireless section 13. In order to change a mode of operation according to the current position and the vehicle speed which are inputted from an external instrument (an engine ECU 20 and car navigation ECU 22), What is necessary is just to stop the electric power supply to both transceiver sections 13a and 13b moreover, that what is necessary is to supply power to either PHS transceiver section 13a or PDC transceiver section 13b, when the current position has separated from any area of PHS and PDC. For this reason, power consumption can be stopped low.

[0027] Here, when the component of this operation gestalt and this invention is contrasted, the speed sensor 21 and Engine ECU 20 of this operation gestalt are equivalent to the vehicle speed detection means of this invention, the GPS antenna 23 and car navigation ECU 22 are equivalent to the location detection means of this invention, and CPU17a of a control section 17 is equivalent to a vehicle speed decision means, a vehicle speed flattery change control means, an area decision means, an area flattery change control means, and a change control means.

[0028] In addition, as long as the gestalt of operation of this invention is not limited to the above-mentioned operation gestalt at all and belongs to the technical range of this invention, it cannot be overemphasized that various gestalten can be taken. For example, conventionally, although the satellite PDC in which a wireless message is possible is known through the earth station PDC and satellite in which a wireless message is possible through the earth station, which method of these may be used for PDC as PDC transceiver section 13b of the above-mentioned operation gestalt. Moreover, the wireless section 13 may consist of the PHS transceiver section, the earth station PDC transceiver section, and the satellite PDC transceiver section. When it is judged at this time that NO, i.e., the vehicle speed, is not a low speed in the case where NO, i.e., the current position, is judged to be the outside of PHS area by S120 in the flow chart of drawing 2 , or S140, as shown in drawing 3 ,

the current position judges whether it is earth station PDC area (S210), if it is in earth station PDC area (it is YES at S210), power will be supplied only to the earth station PDC transceiver section (S220), and this processing will be finished. On the other hand, if it is outside earth station PDC area (it is NO at S210), the current position will judge whether it is the inside of satellite PDC area (S230), if it is in satellite PDC area (it is YES at S230), power will be supplied only to the satellite PDC transceiver section (S240), and this processing will be finished. On the other hand, if the current position is outside satellite PDC area in S230 (it is NO at S230), this processing will be finished, supplying power to neither of the transceiver sections (S250). In addition, phonecall charges become high in order of the PHS transceiver section, the earth station PDC transceiver section, and the satellite PDC transceiver section, and the area which can be talked over the telephone becomes large at this order. According to this mode-of-operation change processing, the same effectiveness as the above-mentioned operation gestalt is acquired.

[0029] Moreover, although PHS area information and PDC area information used what was memorized by ROM17b of a control section 17, an external instrument like CD-ROM drive equipment is connected to a control section 17 through an external connection terminal, and you may make it read such area information from a record medium like CD-ROM with which area information was recorded through this external instrument with the above-mentioned operation gestalt. Or I have area information transmitted from a base information center via the Internet etc., or you may make it collect information according to a demand.

[0030] Furthermore, although PHS transceiver section 13a and PDC transceiver section 13b were considered as the respectively independent configuration, you may constitute from an above-mentioned operation gestalt in the circuit to share and the circuit used only by one side like the complex-terminal machine for mobile communication indicated by [Embodiment of the Invention] and drawing 1 of JP,9-163450,A. In this case, in changing so that it may transmit and receive in PHS transceiver section 13a, power is supplied to the circuit to share and the circuit used only with PHS, and it does not supply power to the circuit used only by PDC. On the contrary, in changing so that it may transmit and receive in PDC transceiver section 13b, power is supplied to the circuit to share and the circuit used only by PDC, and it does not supply power to the circuit used only with PHS.

[0031] Furthermore, if it will progress to S150 and power will be supplied only to PHS transceiver section 13a in the flow chart of drawing 2 again, if the current position is judged to be the inside of PHS area by S120 (it is YES at S120), and the current position is judged to be the outside of PHS area by S120 (it is NO at S120), it may progress to S170 and power may be supplied only to PDC transceiver section 13b. Or if it will progress to S150 and power will be supplied only to PHS transceiver section 13a, if it progresses to S130 immediately, the vehicle speed is detected after processing initiation and it is judged as a low speed by S140 (it is YES at S140), and it is judged by

S140 that it is high-speed (it is NO at S140), it may progress to S170 and power may be supplied only to PDC transceiver section 13b.

[0032] In addition, as a cellular mold radiotelephone explained above, you may be which communication modes, such as a TDMA method and a CDMA method. Moreover, if the PHS transceiver section and the PDC transceiver section as the wireless section are prepared in a cradle and the PHS transceiver section is prepared in a hand set when a hand set and a cradle are divided and are constituted as non-portable telephone equipment for mount, the hand kit of radio system can be constituted using the transceiver ability of PHS. Moreover, if the power antenna is installed in the vehicle, it will become possible to perform the communication link by PHS to fitness more.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a block diagram showing the whole radio-telephone-equipment configuration for mount of this operation gestalt.

[Drawing 2] It is the flow chart of the mode-of-operation change processing which the control section of the radio telephone equipment for mount of this operation gestalt performs.

[Drawing 3] It is the flow chart of the mode-of-operation change processing which the control section of the radio telephone equipment for mount of another operation gestalt performs.

[Description of Notations]

10 [... The wireless section, the 13 a...PHS transceiver section, the 13 b...PDC transceiver section, 14 / ... A loudspeaker, 15 / ... A microphone, 16 / ... The power control section, 17 / ... A control section, 18 / ... An antenna, 19 / ... A power supply section, 20 / ... Engine ECU, 21 / ... A speed sensor, 22 / ... Car navigation ECU, 23 / ... GPS antenna] ... The radio telephone equipment for mount, 11 ... A display, 12 ... A control unit, 13

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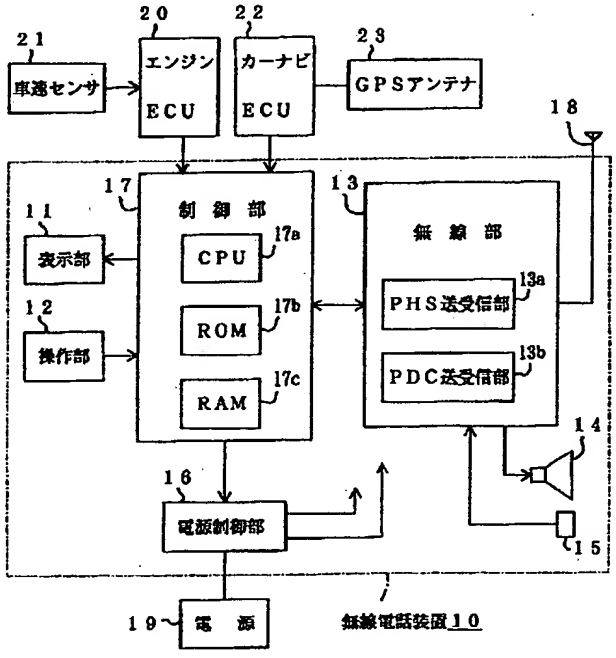
(54)【発明の名称】　車載用無線電話装置

(57)【要約】

【課題】　車両搭載用であって、低電力でセルラー型とコードレス型のいずれかに自動設定可能な無線電話装置を提供する。

【解決手段】　車載用無線電話装置１０は、無線部１３と制御部１７とを備えている。制御部１７は、カーナビＥＣＵ２２から入力される現在位置を検出し、その現在位置がＰＨＳエリア内ならば、エンジンＥＣＵ２０から入力される車速を検出し、車速が低速ならば、ＰＨＳ送受信部１３ａにのみ電力を供給し、ＰＨＳ送受信部１３ａにて送受信するように切り替える。一方、現在位置がＰＨＳエリア外か車速が高速の場合には、現在位置がＰＤＣエリア内であればＰＤＣ送受信部１３ｂにのみ電力を供給し、ＰＣＤ送受信部１３ｂにて送受信するように切り替えるが、現在位置がＰＤＣエリア外ならば送受信部１３ａ、１３ｂには電力を供給しない。



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【特許請求の範囲】

【請求項１】　コードレス型無線電話機とセルラー型無線電話機の両方を備えた車載用無線電話装置において、車速を検出する車速検出手段と、

前記車速検出手段によって検出された車速と所定速度とを比較して該車速が低速であるか否かを判断する車速判断手段と、

前記車速判断手段により車速が所定速度未満と判断されたならばコードレス型無線電話機にて送受信するように切り替え、車速が所定速度以上と判断されたならばセルラー型無線電話機にて送受信するように切り替える車速追従切替制御手段とを備えたことを特徴とする車載用無線電話装置。

【請求項２】　コードレス型無線電話機とセルラー型無線電話機の両方を備えた車載用無線電話装置において、現在位置を検出する位置検出手段と、

前記位置検出手段によって検出された現在位置がコードレス型無線電話機の使用可能エリアに属するか否かを判断するエリア判断手段と、

前記エリア判断手段により現在位置が前記使用可能エリアに属すると判断されたならばコードレス型無線電話機にて送受信するように切り替え、現在位置が前記使用可能エリアに属さないと判断されたならばセルラー型無線電話機にて送受信するように切り替えるエリア追従切替制御手段とを備えたことを特徴とする車載用無線電話装置。

【請求項３】　コードレス型無線電話機とセルラー型無線電話機の両方を備えた車載用無線電話装置において、車速を検出する車速検出手段と、

前記車速検出手段によって検出された車速と所定速度とを比較して該車速が低速であるか否かを判断する車速判断手段と、

現在位置を検出する位置検出手段と、

前記位置検出手段によって検出された現在位置がコードレス型無線電話機の使用可能エリアに属するか否かを判断するエリア判断手段と、

前記車速判断手段により車速が低速と判断され且つ前記エリア判断手段により現在位置が前記使用可能エリアに属すると判断された場合にはコードレス型無線電話機にて送受信するように切り替え、車速が低速でないか又は現在位置が前記使用可能エリアに属さない場合にはセルラー型無線電話機にて送受信するように切り替える切替制御手段とを備えたことを特徴とする車載用無線電話装置。

【請求項４】　請求項３記載の車載用無線電話装置であって、

前記切替制御手段は、車速が低速でないか又は現在位置が前記使用可能エリアに属さない場合で、しかも現在位置がセルラー型無線電話機の使用可能エリアに属さない場合には、コードレス型無線電話機とセルラー型無線電話機のいずれにも電力を供給しないことを特徴とする車載用無線電話装置。

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【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、ＰＨＳ（Personal Handyphone System、パーソナル・ハンディホン・システム）に代表されるコードレス型無線電話機と、携帯電話などのＰＤＣ（Personal Digital Cellular、パーソナル・ディジタル・セルラー）に代表されるセルラー型無線電話機の両方を備えた車載用無線電話装置に関する。

【０００２】

【従来の技術】コードレス型無線電話機とセルラー型無線電話機の両方を備えた無線電話装置としては、特開平９－１６３４５０号公報に開示されたものが知られている。この無線電話装置は、無線受信部、無線送信部、制御部をともにセルラー型であるＰＤＣ、コードレス型であるＰＨＳのいずれでも動作できるように構成され、ＰＨＳで通信可能なときはその基地局に登録し、ＰＨＳで通信不可能なときはＰＤＣ基地局へ登録するよう、制御部で制御するものである。具体的には、常時ＰＨＳで基地局への登録を試み、その登録が成功すればＰＨＳにて受信待ち受け状態とし、その登録が成功しなければＰＤＣにて受信待ち受け状態とする。

【０００３】この無線電話装置によれば、ＰＨＳで通話可能なときは通話料が安価で消費電力が小さなＰＨＳとして動作し、ＰＨＳで通話不能なときだけＰＤＣに自動設定されるから、通話料や消費電力が節約でき、しかもＰＤＣの通話可能なエリアに入っていれば、どこでも、又高速移動体上でも通話でき、受信も常に可能になる。

【０００４】

【発明が解決しようとする課題】しかしながら、特開平９－１６３４５０号公報の無線電話装置では、常時ＰＨＳで基地局への登録を試み、その登録が成功するかしないかによって、ＰＨＳで受信待ち受けするかＰＤＣで受信待ち受けするかを決定するため、ＰＤＣで受信待ち受けしている場合でも、ＰＨＳに絶えず電力を供給している必要がある。つまり、ＰＤＣで受信待ち受けしている場合にもかかわらず、ＰＨＳも電力を消費することとなり、十分な節電効果が得られないという問題があった。

【０００５】本発明は上記課題に鑑みなされたものであり、車両搭載用であって、低電力でセルラー型とコードレス型のいずれかに自動設定可能な無線電話装置を提供することを目的とする。

【０００６】

【課題を解決するための手段及び発明の効果】上記課題を解決するため、請求項１記載の発明は、コードレス型無線電話機とセルラー型無線電話機の両方を備えた車載用無線電話装置において、車速を検出する車速検出手段と、前記車速検出手段によって検出された車速と所定速

度とを比較して該車速が低速であるか否かを判断する車速判断手段と、前記車速判断手段により車速が所定速度未満と判断されたならばコードレス型無線電話機にて送受信するように切り替え、車速が所定速度以上と判断されたならばセルラー型無線電話機にて送受信するように切り替える車速追従切替制御手段とを備えたことを特徴とする。

【０００７】この車載用無線電話装置では、車速判断手段は、車速検出手段によって検出された車速と所定速度とを比較して該車速が低速であるか否かを判断する。また、車速追従切替手段は、車速が低速ならば、通話料が安価で消費電力が小さいコードレス型無線電話機にて送受信するように切り替え、車速が低速でなければ（つまり高速ならば）、高速移動体で通話不可能なコードレス型無線電話機ではなく、通話料や消費電力が比較的高いが高速移動体で通話可能なセルラー型無線電話機にて送受信するように切り替える。なお、車速判断手段は車速と所定速度とを比較して低速か否かを判断するが、その際の所定速度はコードレス型電話機の通話可能な速度域を考慮して適宜設定される。

【０００８】この車載用無線電話装置によれば、車速が低速な場合はコードレス型とし、車速が高速の場合にのみセルラー型に切り替えることにより、セルラー型のみを用いる場合に比べて、通話料や消費電力を低く抑えることができる。また、無線電話機を通じて得られる情報に応じてではなく、車速に応じてコードレス型かセルラー型かを切り替えるため、コードレス型へ電力を供給しているときはセルラー型への電力供給を停止し、逆にセルラー型へ電力を供給しているときはコードレス型への電力供給を停止でき、特開平９－１６３４５０号公報の無線電話装置のように絶えずコードレス型へ電力を供給する場合に比べて、消費電力を低く抑えることができる。

【０００９】また、請求項２記載の発明は、コードレス型無線電話機とセルラー型無線電話機の両方を備えた車載用無線電話装置において、現在位置を検出する位置検出手段と、前記位置検出手段によって検出された現在位置がコードレス型無線電話機の使用可能エリアに属するか否かを判断するエリア判断手段と、前記エリア判断手段により現在位置が前記使用可能エリアに属すると判断されたならばコードレス型無線電話機にて送受信するように切り替え、現在位置が前記使用可能エリアに属さないと判断されたならばセルラー型無線電話機にて送受信するように切り替えるエリア追従切替制御手段とを備えたことを特徴とする。

【００１０】この車載用無線電話装置では、エリア判断手段は、位置検出手段によって検出された現在位置がコードレス型無線電話機の使用可能エリアに属するか否かを判断する。また、エリア追従切替手段は、現在位置が前記使用可能エリアに属するならば、通話料が安価で消

費電力が小さいコードレス型無線電話機にて送受信するように切り替え、現在位置が前記使用可能エリアに属さないならば、通話料や消費電力が比較的高いが使用可能エリアが広いセルラー型無線電話機にて送受信するように切り替える。

【００１１】この車載用無線電話装置によれば、現在位置がコードレス型無線電話機の使用可能エリア内の場合はコードレス型とし、この使用可能エリアから外れた場合にのみセルラー型に切り替えることにより、セルラー型のみを用いる場合に比べて、通話料や消費電力を低く抑えることができる。また、無線電話機を通じて得られる情報に応じてではなく、現在位置に応じてコードレス型かセルラー型かを切り替えるため、コードレス型へ電力を供給しているときはセルラー型への電力供給を停止し、逆にセルラー型へ電力を供給しているときはコードレス型への電力供給を停止でき、特開平９－１６３４５０号公報の無線電話装置のように絶えずコードレス型へ電力を供給する場合に比べて、消費電力を低く抑えることができる。

【００１２】更に、請求項３記載の発明は、コードレス型無線電話機とセルラー型無線電話機の両方を備えた車載用無線電話装置において、前記車速検出手段と、前記車速判断手段と、前記位置検出手段と、前記エリア判断手段と、前記車速判断手段により車速が低速と判断され且つ前記エリア判断手段により現在位置が前記使用可能エリアに属すると判断された場合にはコードレス型無線電話機にて送受信するように切り替え、車速が低速でないか又は現在位置が前記使用可能エリアに属さない場合にはセルラー型無線電話機にて送受信するように切り替える切替制御手段とを備えたことを特徴とする。

【００１３】この車載用無線電話装置では、切替制御手段は、車速が低速で且つ現在位置がコードレス型無線電話機の使用可能エリアに属する場合にはコードレス型無線電話機にて送受信するように切り替え、車速が低速でない又は現在位置がコードレス型無線電話機の使用可能エリアに属さない場合にはセルラー型無線電話機にて送受信するように切り替える。つまり、車速が低速であっても現在位置がコードレス型無線電話機の使用可能エリア外ならばコードレス型は使用できず、また、現在位置がコードレス型無線電話機の使用可能エリア内であっても車速が高速ならばコードレス型は使用できないため、このような場合にはセルラー型に切り替えるのである。この車載用無線電話装置によれば、請求項１、２と同様の効果が有効に得られる。

【００１４】この請求項３の車載用無線電話装置においては、請求項４に記載したように、前記切替制御手段は、車速が低速でないか又は現在位置が前記使用可能エリアに属さない場合で、しかも現在位置がセルラー型無線電話機の使用可能エリアに属さない場合には、コードレス型無線電話機とセルラー型無線電話機のいずれにも

電力を供給しないように構成してもよい。この場合、いずれの無線電話機でも使用不可能な場合には、電力を消費することがないため、一層消費電力を抑えることができる。

【００１５】

【発明の実施の形態】以下に、本発明の好適な実施形態を図面に基づいて説明する。図１は、本発明が適用された実施形態の車載用無線電話装置の全体構成を表わすブロック図である。

【００１６】車載用無線電話装置１０は、自動車電話のように車両に据え置きされたものであってもよいし、あるいは、一般的な携帯電話のように携帯可能なものであってもよい。この車載用無線電話装置１０は、他の電話装置から送信されてきたメッセージやこの電話装置１０の操作案内・動作状況等を表示するためのＬＣＤなどの表示部１１と、ダイヤル入力や通話開始・終了の指示やカナ・英数字入力などを行うためのキースイッチ群を備えた操作部１２と、図示しない基地局との間で無線通信を行うためのアンテナ１８を介して周知の変調方式によって音声を送受信する無線部１３と、通話時に相手の音声を出力するためのスピーカ１４と、通話時に自分の音声を入力するためのマイク１５と、電源部１９から車載用無線電話装置１０の各部への電力供給を制御するための電源制御部１６と、周知のＣＰＵ１７ａ、ＲＯＭ１７ｂ、ＲＡＭ１７ｃなどで構成されたマイコンからなる制御部１７とを備えている。

【００１７】制御部１７には、外部機器としてエンジンＥＣＵ２０とカーナビゲーションＥＣＵ（以下カーナビＥＣＵともいう）２２が接続されている。エンジンＥＣＵ２０は、エンジン制御に必要な各種の処理を実行するものであるが、本実施形態では車速を検出する車速センサ２１からの入力信号を制御部１７へ出力する役割を果たす。また、カーナビＥＣＵ２２は、図示しない車載のＬＣＤなどの表示画面に地図を表示すると共にその地図上に現在位置を表示する処理を実行するものであるが、本実施形態ではＧＰＳアンテナ２３から人工衛星の電波を受信し三角測量の原理を利用して求めた現在位置を制御部１７へ出力する役割を果たす。

【００１８】無線部１３には、スピーカ１４とマイク１５が接続され、コードレス型無線電話機であるＰＨＳとして機能するためのＰＨＳ送受信部１３ａとセルラー型無線電話機であるＰＤＣとして機能するためのＰＤＣ送受信部１３ｂとがそれぞれ個別に設けられている。ＰＨＳ送受信部１３ａ及びＰＤＣ送受信部１３ｂは、それぞれ周知のＰＤＣ及びＰＨＳと同様にして、マイク１５に入力された音声をアンテナ１８を介して基地局へ送信し、また、アンテナ１８で受信した基地局からの受信波をスピーカ１４から音声として出力する。

【００１９】すなわち、無線部１３のＰＨＳ送受信部１３ａは、電源制御部１６から電力が供給されるとアンテナ１８を介してＰＨＳの基地局と送受信可能な状態となり、アンテナ１８で基地局からの受信波を受信すると、これを中間周波数帯の信号に変換し、更にベースバンド信号に変換した後、所定の処理を経てアナログ信号に変換し、スピーカ１４から音声として出力する。また、マイク１５に入力されたアナログ信号をディジタル信号に変換した後、図示しない時分割制御回路により定められた送信タイミングでベースバンド信号とし、このベースバンド信号を変調し、コードレス方式の無線周波数を有する信号（１．９ＧＨｚ帯）に変換し、アンテナ１８から基地局へ送信する。

【００２０】また、無線部１３のＰＤＣ送受信部１３ｂは、電源制御部１６から電力が供給されるとアンテナ１８を介してＰＤＣの基地局と送受信可能な状態となり、アンテナ１８で基地局からの受信波を受信すると、これを中間周波数帯の信号に変換し、更にベースバンド信号に変換した後、所定の処理を経てアナログ信号に変換後、スピーカ１４から音声として出力する。また、マイク１５に入力されたアナログ信号をディジタル信号に変換した後、図示しない時分割制御回路により定められた送信タイミングで変調し、これをアンテナ１８から基地局へ送信する。

【００２１】次に、上記構成の車載用無線電話装置１０の制御部１７の処理について説明する。制御部１７のＣＰＵ１７ａは、ＲＯＭ１７ｂに記憶された各種のプログラムを実行するが、ここでは所定時間（例えば数ｍｓ）毎に実行される動作モード切替処理について説明する。図２はこの動作モード切替処理のフローチャートである。

【００２２】この処理が開始されると、制御部１７のＣＰＵ１７ａは、まずステップ（以下Ｓという）１１０において、カーナビＥＣＵ２２から入力される現在位置を検出する。なお、カーナビＥＣＵ２２は、ＧＰＳのみならずビーコン等から発信される電波を利用して車両の現在位置を求めてもよいし、方位センサと車速センサ（又は車輪速センサ）から車両の現在位置を求めてもよい。

【００２３】続くＳ１２０において、制御部１７のＣＰＵ１７ａは現在位置がＰＨＳエリア内か否かを判断する。本実施形態では、制御部１７のＲＯＭ１７ｂには、予めＰＨＳエリア情報（どのエリアでＰＨＳが使用可能かを示す情報）が記憶されている。ＣＰＵ１７ａは、現在位置とこのＰＨＳエリア情報とを照らし合わせ、現在位置がＰＨＳエリア外であれば（Ｓ１２０でＮＯ）、ＰＨＳでの通話が不可能なため後述するＳ１６０に進み、一方、現在位置がＰＨＳエリア内であれば（Ｓ１２０でＹＥＳ）、続くＳ１３０でエンジンＥＣＵ２０を介して車速センサ２１で検出された車速を入力し、更に続くＳ１４０でこの車速とＲＯＭ１７ｂに予め記憶された所定速度（本実施形態ではＰＨＳが通話可能な速度として１０～２０ｋｍ（ｈの範囲内で定められた数値）とを比較

する。そして、車速が低速つまり車速が所定速度よりも小さければ（Ｓ１４０でＹＥＳ）、続くＳ１５０で電源制御部１６を介して無線部１３のＰＨＳ送受信部１３ａにのみ電力を供給し、ＰＨＳ送受信部１３ａにて送受信するように切り替えて、この処理を終える。一方、車速が高速つまり車速が所定速度以上ならば（Ｓ１４０でＮＯ）、ＰＨＳでの通話が不可能なため、Ｓ１６０に進む。

【００２４】Ｓ１６０において、制御部１７のＣＰＵ１７ａは、現在位置がＰＤＣエリア内か否かを判断する。本実施形態では、制御部１７のＲＯＭ１７ｂには予めＰＤＣエリア情報（どのエリアでＰＤＣが使用可能かを示す情報）が記憶されている。ＣＰＵ１７ａは、現在位置とこのＰＤＣエリア情報とを照らし合わせ、現在位置がＰＤＣエリア内であれば（Ｓ１６０でＹＥＳ）、続くＳ１７０で電源制御部１６を介して無線部１３のＰＤＣ送受信部１３ｂにのみ電力を供給し、ＰＤＣ送受信部１３ｂにて送受信するように切り替えて、この処理を終える。一方、現在位置がＰＤＣエリア外であれば（Ｓ１６０でＮＯ）、ＰＨＳでもＰＤＣでも通話が不可能であるため、続くＳ１８０で電源制御部１６を介してＰＨＳ送受信部１３ａとＰＤＣ送受信部１３ｂのいずれにも電力を供給せず、この処理を終える。

【００２５】以上のように、この車載用無線電話装置１０によれば、現在位置がＰＨＳエリア内で車速が低速ならば、通話料や消費電力が比較的低いＰＨＳ送受信部１３ａにて送受信するように切り替え、現在位置がＰＨＳエリア外か車速が高速ならば、通話料や消費電力が比較的高いが高速移動体で通話可能なＰＤＣ送受信部１３ｂにて送受信するように切り替えるため、ＰＤＣ送受信部１３ｂのみを用いる場合に比べて、通話料や消費電力を低く抑えることができる。

【００２６】また、この車載用無線電話装置１０は、無線部１３を通じて得られる情報に応じて動作モードを切り替えるのではなく、外部機器（エンジンＥＣＵ２０やカーナビＥＣＵ２２）から入力される現在位置や車速に応じて動作モードを切り替えるため、ＰＨＳ送受信部１３ａ又はＰＤＣ送受信部１３ｂのいずれか一方にのみ電力を供給すればよく、しかも、現在位置がＰＨＳ、ＰＤＣのいずれのエリアからも外れている場合には両方の送受信部１３ａ、１３ｂへの電力供給を停止すればよい。このため、消費電力を低く抑えることができる。

【００２７】ここで、本実施形態と本発明との構成要素を対比すると、本実施形態の車速センサ２１及びエンジンＥＣＵ２０が本発明の車速検出手段に相当し、ＧＰＳアンテナ２３及びカーナビＥＣＵ２２が本発明の位置検出手段に相当し、制御部１７のＣＰＵ１７ａが車速判断手段、車速追従切替制御手段、エリア判断手段、エリア追従切替制御手段、切替制御手段に相当する。

【００２８】尚、本発明の実施の形態は、上記実施形態に何ら限定されるものではなく、本発明の技術的範囲に属する限り種々の形態を採り得ることはいうまでもない。例えば、従来よりＰＤＣは、地上局を介して無線通話可能な地上局ＰＤＣと、衛星を介して無線通話可能な衛星ＰＤＣとが知られているが、上記実施形態のＰＤＣ送受信部１３ｂとしては、このうちのどちらの方式を採用してもよい。また、無線部１３を、ＰＨＳ送受信部と地上局ＰＤＣ送受信部と衛星ＰＤＣ送受信部とで構成してもよい。このとき、図２のフローチャートにおけるＳ１２０でＮＯつまり現在位置がＰＨＳエリア外と判断された場合やＳ１４０でＮＯつまり車速が低速でないと判断された場合、図３に示すように、現在位置が地上局ＰＤＣエリアか否かを判断し（Ｓ２１０）、地上局ＰＤＣエリア内であれば（Ｓ２１０でＹＥＳ）、地上局ＰＤＣ送受信部にのみ電力を供給し（Ｓ２２０）、この処理を終える。一方、地上局ＰＤＣエリア外であれば（Ｓ２１０でＮＯ）、現在位置が衛星ＰＤＣエリア内か否かを判断し（Ｓ２３０）、衛星ＰＤＣエリア内であれば（Ｓ２３０でＹＥＳ）、衛星ＰＤＣ送受信部にのみ電力を供給し（Ｓ２４０）、この処理を終える。一方、Ｓ２３０で現在位置が衛星ＰＤＣエリア外であれば（Ｓ２３０でＮＯ）、いずれの送受信部にも電力を供給しないまま（Ｓ２５０）、この処理を終える。なお、通話料はＰＨＳ送受信部、地上局ＰＤＣ送受信部、衛星ＰＤＣ送受信部の順に高くなり、通話可能エリアはこの順に広くなる。この動作モード切替処理によれば、上記実施形態と同様の効果が得られる。

【００２９】また、上記実施形態では、ＰＨＳエリア情報やＰＤＣエリア情報は制御部１７のＲＯＭ１７ｂに記憶されたものを用いたが、制御部１７に外部接続端子を介してＣＤ－ＲＯＭドライブ装置のような外部機器を接続し、この外部機器を介してエリア情報が記録されたＣＤ－ＲＯＭのような記録媒体からこれらのエリア情報を読み込むようにしてもよい。あるいは、インターネット経由等で基地情報センターからエリア情報を送信してもらうか、もしくは要求に応じて情報を収集するようにしてもよい。

【００３０】更に、上記実施形態では、ＰＨＳ送受信部１３ａとＰＤＣ送受信部１３ｂをそれぞれ独立の構成としたが、特開平９－１６３４５０の［発明の実施の形態］及び図１に記載された移動通信用複合端末機のように、共用する回路と一方のみで使用する回路とで構成してもよい。この場合、ＰＨＳ送受信部１３ａにて送受信するように切り替える場合には、共用する回路とＰＨＳでのみ使用する回路に電力を供給し、ＰＤＣでのみ使用する回路には電力を供給しない。逆に、ＰＤＣ送受信部１３ｂにて送受信するように切り替える場合には、共有する回路とＰＤＣでのみ使用する回路に電力を供給し、ＰＨＳでのみ使用する回路には電力を供給しない。

【００３１】更に又、図２のフローチャートにおいて

Ｓ１２０で現在位置がＰＨＳエリア内と判断されたならば（Ｓ１２０でＹＥＳ）、Ｓ１５０へ進んでＰＨＳ送受信部１３ａにのみ電力を供給し、Ｓ１２０で現在位置がＰＨＳエリア外と判断されたならば（Ｓ１２０でＮＯ）、Ｓ１７０に進んでＰＤＣ送受信部１３ｂにのみ電力を供給してもよい。あるいは、処理開始後、直ちにＳ１３０に進んで車速を検出し、Ｓ１４０で低速と判断されたならば（Ｓ１４０でＹＥＳ）、Ｓ１５０へ進んでＰＨＳ送受信部１３ａにのみ電力を供給し、Ｓ１４０で高速と判断されたならば（Ｓ１４０でＮＯ）、Ｓ１７０に進んでＰＤＣ送受信部１３ｂにのみ電力を供給してもよい。

【００３２】なお、上記にて説明したセルラー型無線電話機としては、ＴＤＭＡ方式、ＣＤＭＡ方式等いずれの通信方式であってもよい。また、車載用の据え置き型の電話装置として、ハンドセットとクレードルとが分かれて構成された場合、クレードルに無線部としてのＰＨＳ送受信部とＰＤＣ送受信部とを設け、ハンドセットにＰＨＳ送受信部を設ければ、ＰＨＳのトランシーバ機能を利用して無線方式のハンドキットを構成することができる。また、車にパワーアンテナを設置しておけば、ＰＨＳによる通信をより良好に行うことが可能となる。

【図面の簡単な説明】

【図１】　本実施形態の車載用無線電話装置の全体構成を表わすブロック図である。

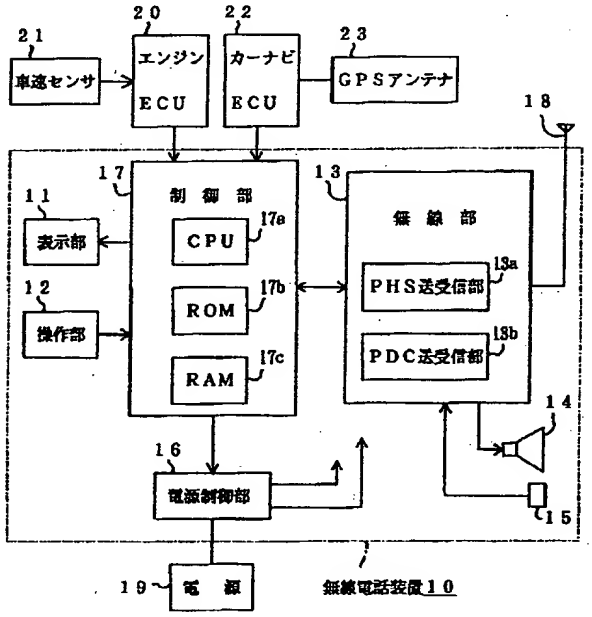
【図２】　本実施形態の車載用無線電話装置の制御部が実行する動作モード切替処理のフローチャートである。

【図３】　別の実施形態の車載用無線電話装置の制御部が実行する動作モード切替処理のフローチャートである。

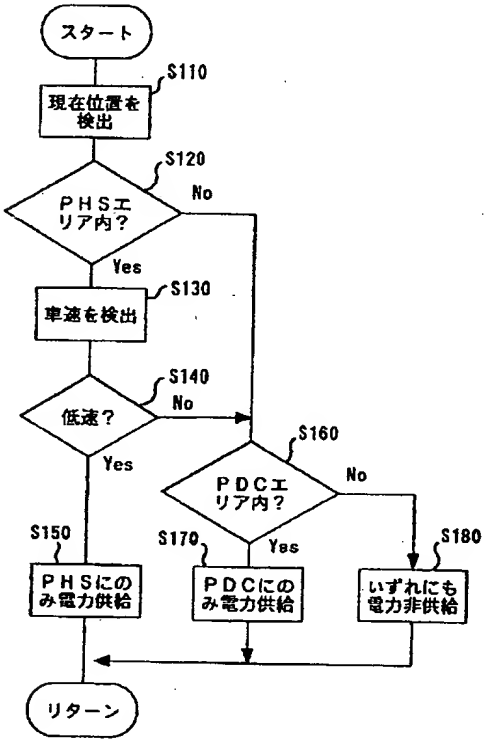
【符号の説明】

１０・・・車載用無線電話装置、１１・・・表示部、１２・・・操作部、１３・・・無線部、１３ａ・・・ＰＨＳ送受信部、１３ｂ・・・ＰＤＣ送受信部、１４・・・スピーカ、１５・・・マイク、１６・・・電源制御部、１７・・・制御部、１８・・・アンテナ、１９・・・電源部、２０・・・エンジンＥＣＵ、２１・・・車速センサ、２２・・・カーナビＥＣＵ、２３・・・ＧＰＳアンテナ。

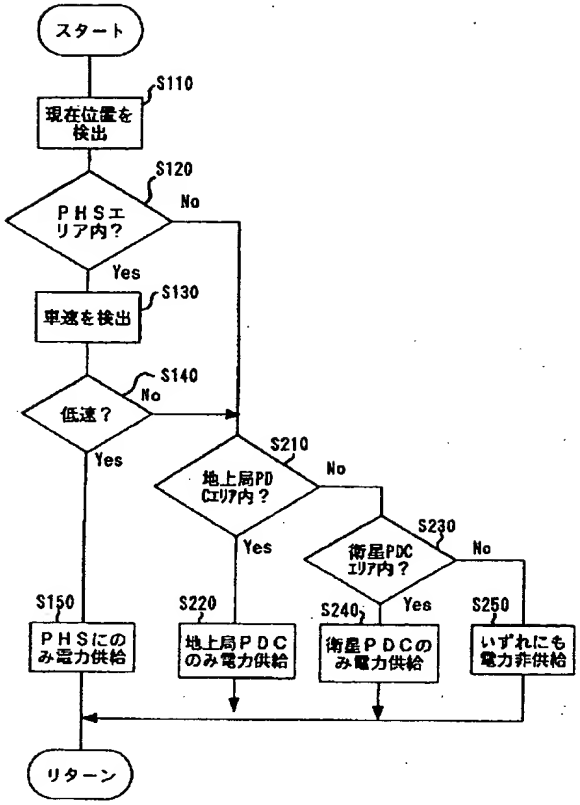
【図１】



【図２】



【図３】


スタート
S110
現在位置を検出
S120
PHSエリア内？
No
Yes
S130
車速を検出
S140
低速？
No
Yes
S210
地上局PDCエリア内？
No
Yes
S230
衛星PDCエリア内？
No
Yes
S150
PHSにのみ電力供給
S220
地上局PDCのみ電力供給
S240
衛星PDCのみ電力供給
S250
いずれにも電力非供給
リターン

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